

Letter from Alexander Graham Bell to Mabel Hubbard Bell, November 29, 1909

November 29, 1909. Mrs. Alexander Graham Bell, Twin Oaks, Washington, D. C. My dear Mabel:

I send you a few Sunday thoughts from the House-boat:—

Intelligent Dust

Nov. 28: —The world is about 8000 miles in diameter. It would therefore take 7,040,000 men, each six feet tall, standing one on top of the other, to equal the diameter of the world.

From this it follows that a man is much smaller in proportion to the globe on which he stands, than a cheese-mite is to the cheese he inhabits.

Reduce the world to the size of a cheese. Consider it as a globe one foot in diameter. What then would be the size of a man?

2

He would be less than 1 n e seven-millionth of a foot in height about the $\frac{1}{586675}$ th part of an inch:— An entirely insignificant individual, who would be invisible even under a powerful microscope.

Who would dream of the living dust of a cheese as capable of thought; and yet we ourselves constitute mere dust upon the surface of the world — but *intelligent dust* at that.

AGB

The Neighboring Worlds

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Nov. 28: — I am much interested in Percival Lowell's article upon Venus in the Popular Science Monthly for December; and especially in the consequences he deduces from the supposed fact that Venus keeps one face constantly turned towards the Sun, as the Moon keeps one face constantly turned towards us.

In Venus we have a world very like our own. She is about the same size and is surrounded by an atmosphere like ours. She is our next-door neighbor, the nearest to us of all the Planets, and most like the Earth in every respect. The question period of her rotation, however, has been a vexed question with Astronomers for a long time past. If, as has often been stated, she rotates once in twenty-four hours, the conditions upon Venus would be so similar to those upon our Earth, as to be quite consistent with the support of similar life there. No signs of life, however, have so far been observed; and now Professor Lowell comes forward with a statement concerning rotation that almost deprives us of hope.

Mars

Mars, our next-door neighbor on the other side, does rotate in about the same period as the earth (24 hours). He is smaller than the Earth, and has an atmosphere much less dense, so that the conditions are less favorable than here for the existence of life. Still there are indications of life there and of intelligent life too.

We can see the snow-covered areas at the Poles through our telescopes, and watch them melt away when exposed to the Sun. We can see changes of color in some parts of the planet that are suggestive of a process of vegetation. But the real interest of Mars lies in the peculiar markings known as "canals" which suggest the possibility that intelligent beings inhabit Mars who are capable of planning and constructing irrigation works upon a gigantic scale.

Of course the irrigation canals themselves could not be visible from here; and the straight lines observed, whatever they may be, are certainly not canals. The finest line upon Mars

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which could be seen from the earth would be several miles in width. All that we could hope to see therefore in connection with an irrigation canal, would be the strip of vegetation bordering upon the canal. A strip of irrigated land, say four or five miles wide, might be seen from the earth as a fine and narrow line; and would resemble one of the so-called "canals" of Mars.

Now what do we actually see upon Mars? We can see the melting of the Polar snow-cap in the Arctic region. Then, as the snow begins to melt, the "canals" begin to appear: First near the Polar area and afterwards extending further down to the South. Professor Lowell translates this to mean that when the ice-cap melts the inhabitants of Mars conduct the water to their desert lands, and irrigate their crops.

The straight lines, or "canals", when first observed, are of a darkish green color, the supposed color of the crop; but as the season advances they change color and become reddish brown, and the crops are supposed to be ripe. Then, following this, the so-called "canals" completely disappear. This may be interpreted to mean that the crops have been harvested, and that Thanksgiving day has arrived. Next year the canals reappear at the same season, and again go through the same series of changes.

The arrangement of these numerous straight lines, or "canals", is such *as to indicate design*. It is a little difficult to say why; but a glance at a map of Mars will show what I mean.

If we look down upon an American City like Washington D. C. (which was planned as a whole before it was built), we get a map-like effect in which, at a sufficiently great distance away, the parks and houses would appear as blotches of color intersected by a system of lines representing the streets. We could not possibly mistake the pattern formed by these lines for a natural growth; we would at once recognize design in their arrangements relatively to one another. In a similar manner the arrangement of lines upon Mars are suggestive of design.

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It is difficult to believe that a line of several hundred miles in length, and perfectly straight from end to end, could be a natural phenomenon. But we find hundreds of such lines upon Mars, extending in every direction, and all connected together apparently in a purposive manner.

Assuming them to be natural formations we would expect them to intersect in places; but, in accidental crossings of this kind we would rarely find more than two lines intersecting at the same point. On Mars, however, it is quite the usual thing for a number of lines to come together at the same point: There is nothing exceptional about the matter at all.

The whole arrangement of lines is so strongly suggestive of an artificial state of things, that we cannot avoid the feeling that we may here be looking down upon the results of the work of intelligent beings inhabiting Mars.

The ability to run a line a thousand miles long, exactly in a straight line, involves mathematical ability of the highest order, and a knowledge of the art of surveying. The running of such a line could probably not be done without reference to outside bodies, like the Sun, the Stars, and the Moons of Mars, thus involving a knowledge of Astronomy.

Great engineering abilities are required, and the highest grade of intellect, to carry out the vast engineering scheme which we seem to see in operation on Mars. This is no less a project than the utilization of the ice of the Arctic regions as a source of water supply for the whole globe, and the distribution of the water to the arid regions for the purposes of irrigation.

If the intersecting straight lines described by Schiaparelli, Lowell, and others, really exist as shown in their drawings, there is no escape from the conviction that Mars is inhabited by a highly civilized and intelligent race of beings carrying on a process of agriculture, and wringing subsistence from the desert by water brought from the Polar regions to irrigate the land.

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Venus

It has always seemed strange that we should find indications of life upon the distant planet Mars, where the conditions are very different from those upon Earth; and yet fail to find them on our nearest neighbor, Venus, a sister planet as like the Earth as a twin.

We have hitherto supposed that the reason for our failure may have lain in a difficulty of observation. When Venus is closest to us she is between us and the Sun, and her dark side presents itself to our view. When her bright side is turned this way the Sun is between us, and we cannot see. Mars, on the other hand, presents his bright side at his closest approach; and the net result is that we know a great deal more about Mars than about our closest neighbor, Venus.

Now comes Lowell with the statement that Venus does not spin rapidly upon an axis like the Earth and Mars; but, like Mercury, keeps one side constantly presented to the Sun.

From this he draws interesting, but most disappointing conclusions.

He pictures to us a world scorched upon one side, and frozen on the other; and incapable of any life like that we know. The oceans, he says, have evaporated on the heated side, and have been deposited, as ice and snow, on the other. Cold hurricane winds plough their way into the heated hemisphere from every direction, laden with dust and stones, and tear up the ground into deep radial furrows that can be dimly seen in the telescope of Flagstaff Observatory. The heated air on this hemisphere, he says, overflows above on to the frozen darkened side; but carries no water with it to be deposited there, for the oceans on the heated side have long since been dried up.

There is eternal day there on the heated side, without a cloud to moderate the heat of the Sun: No water, no life, nothing but a desert of scorching sand. On the frozen side we have eternal night, continents of ice and snow, and a cold far below the Arctic temperatures of

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the Earth, and approaching the absolute zero of space. What a scene of desolation, where we had hoped to find a living and breathing world.

Scientific men imagine that all the planets that move around the Sun were once spinning rapidly upon their axes like tops; but that the tidal effects produced by the attraction of the Sun, and by their Moons, acted as a brake to slow down the rotation. It has long been surmised that Mercury, the planet nearest to the Sun, has already slowed down to such an extent as to make only one rotation in the course of a year, thus keeping one face constantly turned to the Sun; and the next planet, Venus, is now reported to be in the same condition.

The third planet in order from the Sun, is our own inhabited world; and there is evidence that the rotation of the Earth is gradually slowly slowing down. Is our world then to be 8 the next to meet the fate of Mercury and Venus? This is the thought that gives special interest to Lowell's researches.

Of course we need hardly be troubled about the matter at the present time at least on our own account. Nor will our descendants be in any danger for many generations yet to come. It is some comfort to us to know that it will take many thousands of years for the Earth to reach the ultimate condition imagined, in which the Sun will stand still in the heavens, and the succession of days and nights will be no more.

Yet, if Astronomers are right, that time will come; and one-half of the Earth will experience an endless scorching day, and the other half an equally endless Arctic night. Where then will be the human race? Will any survive to perpetuate their kind; or will all life disappear forever from the stricken world? To Venus we look for light, but she only turns her dark side this way.

Though one side of Venus be scorched, and the other frozen, surely there must be a mean somewhere between these opposite conditions. Surely there must be a narrow belt around the planet, between the frozen and heated sides constituting a temperate zone where life

Library of Congress

may possibly exist: A region, where the Sun would be forever upon the horizon, without either setting to freeze, or rising to roast, the living things that might take refuge there.

Upon the existence of this narrow ring of life I pin my faith; and I do not yet despair of the safety of the human race. AGB